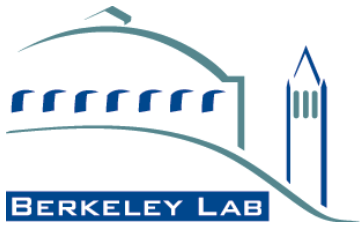
Software Interoperability for Energy Simulation

Robert J. Hitchcock, Ph.D.
Building Technologies Department
Lawrence Berkeley National Laboratory



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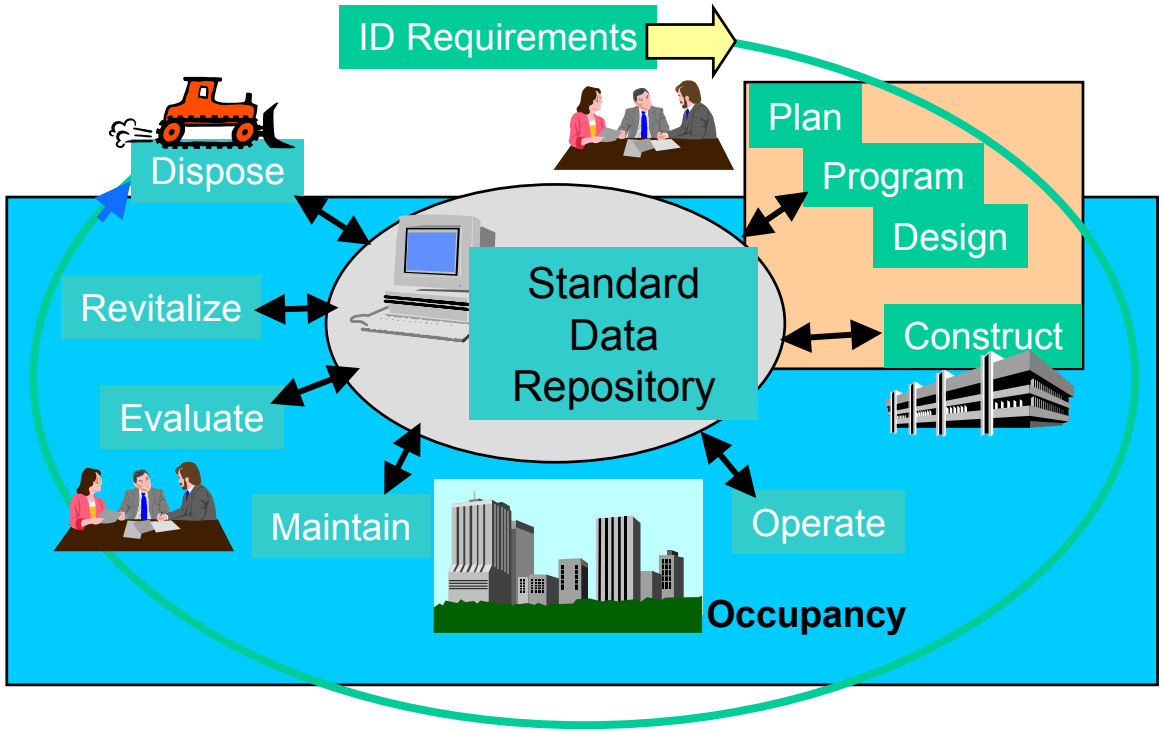
Overview

- Life-Cycle Information Management
- Creating Interoperable Software
  - The IFC Standard Data Model
  - Industry Barriers to Interoperability
  - Software Implementation
- Interoperability for Energy Simulation
  - Data Requirements
  - Current Status and Near Term Future

Life-Cycle Information Management

- Data Acquisition from upstream participants & tools



- Data Archival for downstream participants & tools
- Data Sharing at any point along life cycle stream

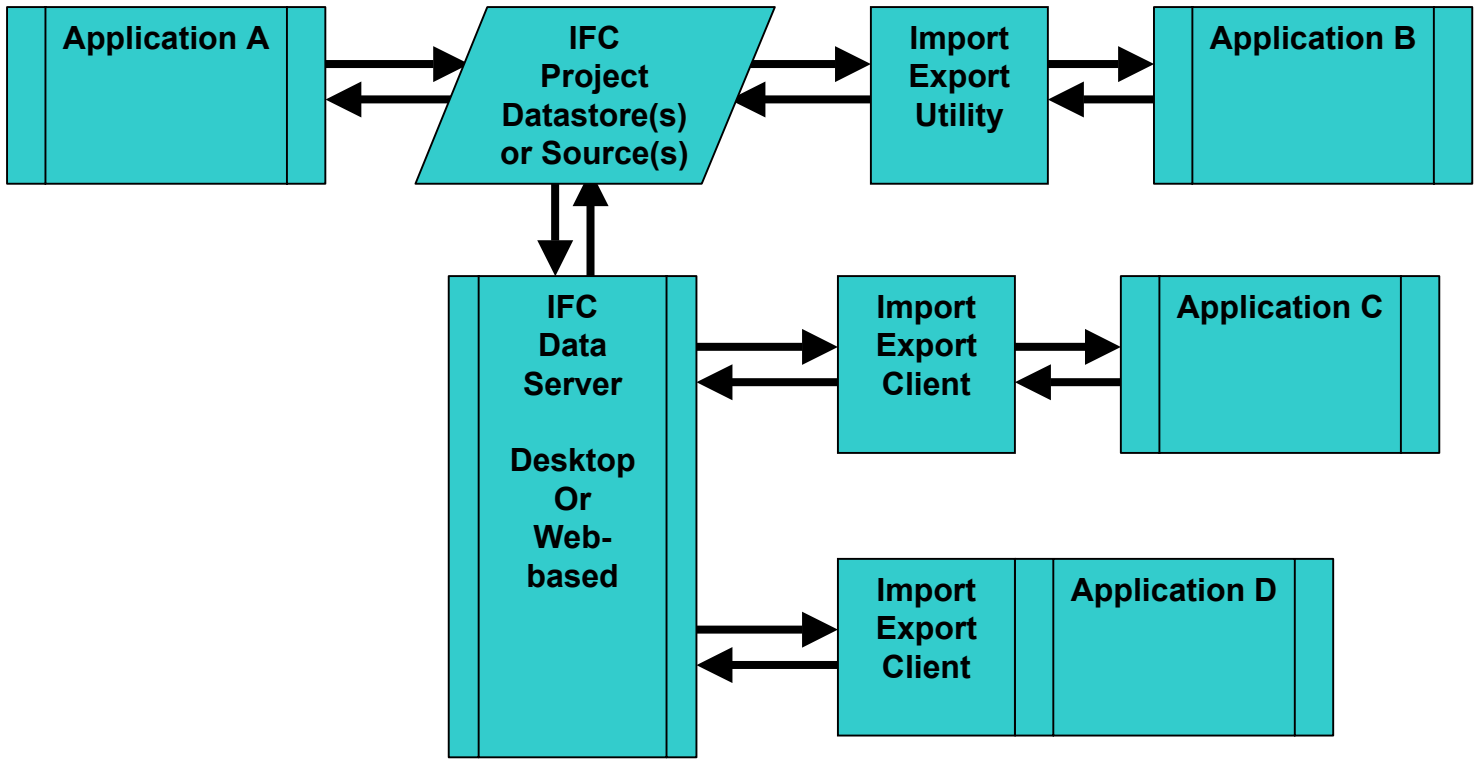
The IFC Standard Data Model

- Geometric Data
  - Location, Shape, and Relationships of Building Elements
    - Site, Building, Building Story, Space, Wall, Window, Door, Column, Beam, Stair, Furniture, Boiler, Chiller, Pump, Fan, etc.
- Non-Geometric Data
  - Material Properties
    - Thermal Conductivity, Specific Heat Capacity, etc.
  - Equipment Properties
    - e.g., Boiler: Type, Heat Output, Pressure Rating , Energy Source, Efficiency, Partial Load Efficiency Curves, etc.
- Ongoing Technical Activities
  - GPC-20 – XML Definitions for HVAC
  - Building Services Project 8 – HVAC for Simulation
  - FIATECH AEX – Automating Equipment Information Exchange

Industry Barriers to Interoperability

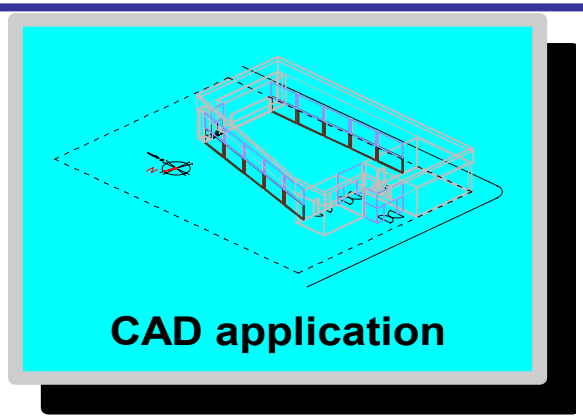
- Developing a comprehensive, stable, robust model
  - IFC Model vs. IFC Software
- Investing in software development
  - Demand vs. Development
- Investing in new technology adoption
  - Benefits vs. Costs
- Moving beyond fragmented industry processes
  - Specialization vs. Integration

Implementing Interoperable Software



Energy Simulation Data Requirements

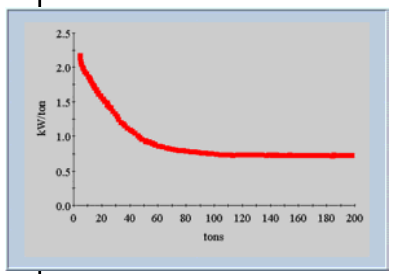
- Geometric Data
  - Building Elements
  - Building Equipment



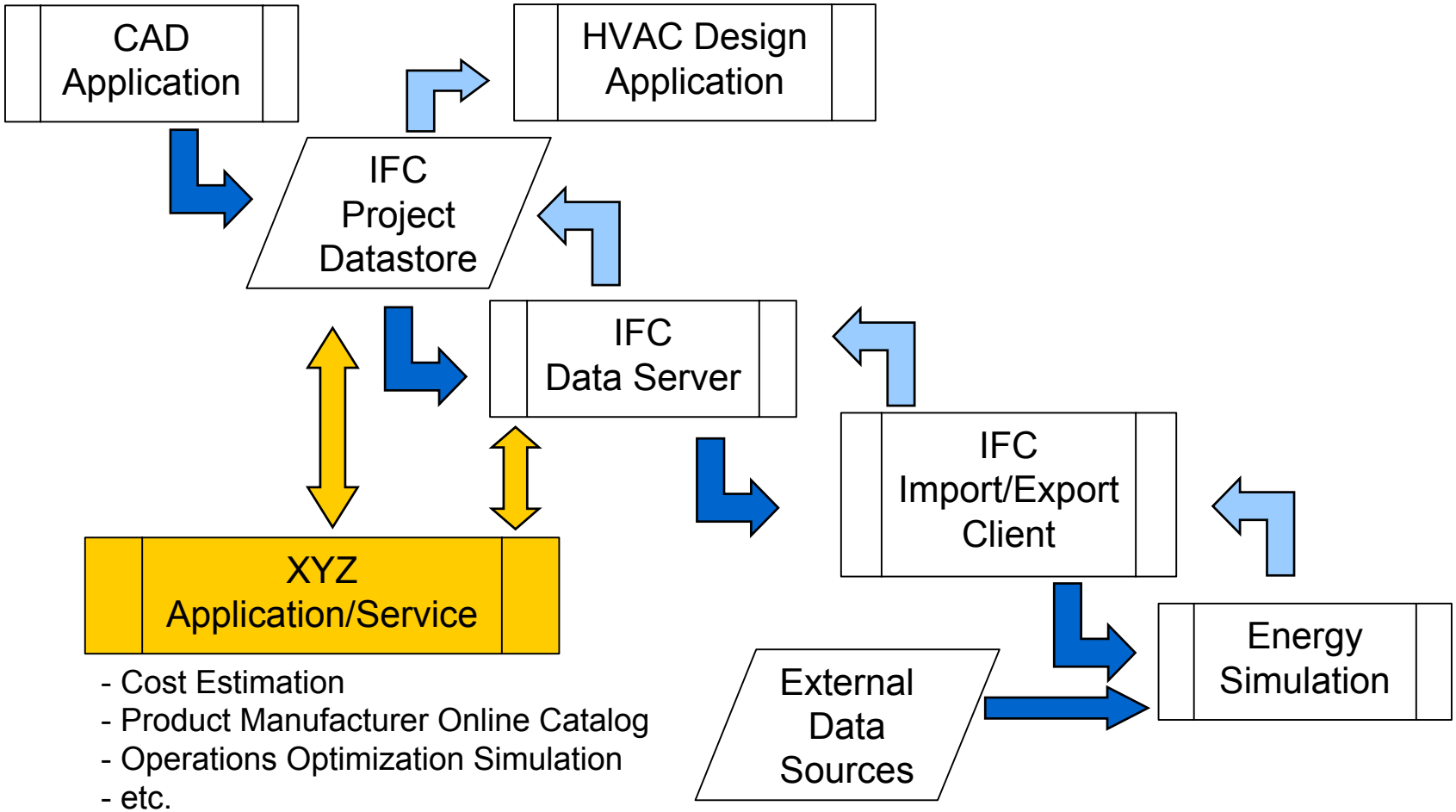
- Non-Geometric Data
  - Material Properties
  - Equipment Properties
  - Building Systems Operation
  - Occupancy, Usage, Zoning, Weather, etc.

Group Code	Description of Construction	U-Value
	Heavyweight concrete wall plus (finish)	
E	4 inch concrete	0.58
D	4 inch concrete + 1 or 2 inch insulation	0.12-0.20
C	2 inch insulation + 4 inch concrete	0.12
C	8 inch concrete	0.49

```
CHILLER:ABSORPTION,
   Big Chiller,  !- Chiller Name
   100000,       !- Nominal Capacity {W}
   250,          !- Nominal Pumping Power {W}
   Big Chiller Inlet Node,
   Big Chiller Outlet Node,
   Big Chiller Condenser Inlet Node,
   Big Chiller Condenser Outlet Node,
   .15,  !- Minimum Part Load Ratio
   1.0,  !- Maximum Part Load Ratio
   .65,  !- Opt Part Load Ratio
   35.0,  !- Temp Design Condenser Inlet {C}
   .0011,  !- Design Evap Vol Flow Rate {m3/s}
   .0011,  !- Design Cond Vol Flow Rate {m3/s}
   0.03303,  !- Coeff1 of steam part load ratio
```



Current Status & Near Term Future



GPC-20, IAI BS-8 HVAC, AEX, and others